



# Mapping of Social Media Research in India: A Scientometric Profile

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## Abstract

Social media is a publication and scholarly communication tool in the media era. This paper presents a scientometric analysis of the scholastic publications by the Indian scientists on social media. The purpose of this study is to provide an overview of research activities in the country on the subject during the period from 1992 to 2015 (24 years) describing various aspects of research output. This paper focuses the various factors and types of Social Media publications such as articles, reviews, editorial materials, article related proceedings papers, book reviews, letters, meeting abstracts, and review based book chapters. It deals with in terms of growth rate of articles, authorship pattern, single vs. joint - authored research publications, International collaboration; Institution based collaboration, ranking of core journals, and productive research areas.

**Keywords:** Social media, Scientometrics, Publication analysis, Vosveiwier, H-index, WoS, India

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## 1. INTRODUCTION

In the digital world, the social media revolution has growing fast and some of the most popular social media such as Facebook, twitter, MySpace, Orkut, skype, Whatsup, Instagram, Tumblr, Pinterest, LinkedIn, Youtube, Viber, and many more are used effectively and efficiently by the groups of people to communicate their information and knowledge. These social media websites have more than 100,000,000 registered users. The terms 'social media' and 'social network' have been used by Mulero (2012) whereas Cann (2011) describes social media as the "online technologies and practices that people use to share opinions, insights, experiences, and perspectives. Social media can take many different forms, including text, images, audio, and video. These sites typically use technologies such as blogs, message boards, podcasts, wikis, and vlogs to allow users to interact".

Social media is a collection of online communication channels which are dedicated to society based interaction, knowledge sharing and collaboration. The social media are different facets such as forums, blogs, social networking, social curation, social book marking and wikis and so on (<http://whatis.techtarget.com/glossary/>). A survey conducted by the American Academy of Pediatrics Council on Communication and Media and the report issued by NY Times (2011) that a large part of this generation's social and emotional development is occurring while on the Internet and on cell phones. Margaret-Rouse (2015) stated that the social media are often used for crowd sourcing so that users can use social networking sites to offer ideas for further products or tweaks. He also uttered that social media supports marketing and customer oriented service activities. A few of the research works have already been done on paracetamol (acetaminophen) poisoning (Zyoud et al 2015), photosynthesis (Yu, et al, 2012), Authorship Trends and Collaborative research work on Library Herald (Velmurugan & Radhakrishnan, 2015), Research Trends on Journal of Intellectual Property Rights (Velmurugan, 2014). Thus, the present study "Mapping of social media research in India: a scientometric profile" is an attempt to investigate the main features in the field of social media.

The purpose of this study is to measure the research performance of individual authors, institutions and countries in terms of scholarly publications on social media literature and the other objectives are (1) to evaluate the source wise publications; (2) to measure the citation analysis; (3) to know the collaboration with other countries; (4) to identify the authorship pattern and (5) to rank the Universities and other Research Institutions. Since these wide goals, the following research questions are used to focus the study.

- Which are the most productive countries producing research papers?
- How many countries are collaborated with India publishing articles on social media?

- Who are the most productive authors of social media literature?
- Which are the most prolific Universities or Research Institutions?
- Which is the predominant journal on social media literature output?

## MATERIALS AND METHOD

The Web of Science core collection (WOSCC) database by Thomas Reuters has been chosen to retrieve the data as it is considered as the main source for this study. The search string ‘‘social media’’ has given in the topic tag and the data was refined by country ‘‘INDIA’’ which were indexed by SCI-EXPANDED, SSCI, A&HCI and ESCI during 1989-2015. A total number of 27,773 research publications were found in global level and 248 scholarly articles were identified from India with 1938 total citations. 1929 records were cited without self-citations and 1890 records were citing articles and the average citations per paper was 7.81 and its h-index was 21 during the study period. To evaluate the scholarly commutations of social media, the following scientometric tools have been employed for this analysis to retrieve the better results for the study. The tools such as Degree of Collaboration (DC), trend line analysis such as Liner and Exponential Growth Model and R- squared value ( $R^2$ ). To retrieve and visualize the publication output on Social Media, the following free as well as commercial computer softwares such as HistCite, Microsoft Excel, VOS viewer and SPSS statistical tools were used.

### 3.1 Data analysis and findings

#### 3.1.1 Year wise distribution and growth rate

Data on 248 items, including 217 articles and 16 reviews publishing from January 1<sup>st</sup> 1992 to December 31<sup>st</sup> 2015 were retrieved using Web of Science core collection database (WOSCC). Table 2 indicates that the year wise distribution of research papers which were published on social media. The results reveal that the major proportion of (64) 25.8% research articles was published in 2015 and ranked first. The next place has got in 2014 with 31 articles (12.5%) and followed by third position has received in 2012 with 30 articles (12.1%). It was observed that the growth rate has been shown after 2011 and the fluctuation trend has seen before 2011. Researchers have measured statistically using SPSS software and has shown in the below table 1.

**Table 1.** Year wise distribution and growth rate

S.No	TY	TR	TP	TC	Statistical measures	
					Descriptions	Value
1	1992	2	0.8	2	Mean	10.33
2	1993	1	0.4	0		
3	1994	1	0.4	0		
4	1995	4	1.6	102	Standard Error	2.92
5	1996	1	0.4	0		
6	1997	3	1.2	14	Median	4
7	1998	1	0.4	10		
8	1999	3	1.2	51	Mode	1
9	2000	4	1.6	4		
10	2001	3	1.2	53	Standard Deviation	14.33
11	2002	2	0.8	37		
12	2003	4	1.6	106	Sample Variance	205.45
13	2004	6	2.4	64		
14	2005	3	1.2	112	Kurtosis	8.1947
15	2006	2	0.8	12		
16	2007	11	4.4	230	Skewness	2.647
17	2008	13	5.2	112		
18	2009	15	6.0	128	Range	63
19	2010	10	4.0	57		
20	2011	18	7.3	334	Minimum	1
21	2012	30	12.1	283		
22	2013	16	6.5	89	Maximum	64
23	2014	31	12.5	96		
24	2015	64	25.8	42		
<b>Total</b>		<b>248</b>	<b>100</b>	<b>1938</b>		

It is also computed trend line analysis accordingly, the exponential growth model has employed based on the trend line to know the growth rate of social media during the study period which were available on MS Excel and found the value of y is  $0.770e^{0.151x}$  and  $R^2$  value is 0.786 (Fig.1). The linear growth model has been employed based on the trend line using MS Excel to know the research trend on social media citations and found the y value is  $7.252x - 9.902$ , and the  $R^2$  value is 0.327(Fig.2).

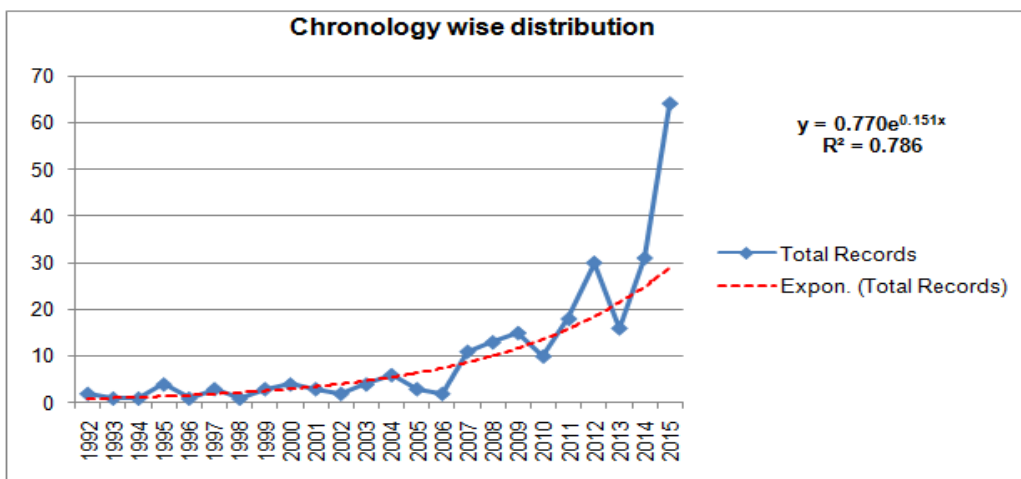


Figure 1. Chronology wise distribution of papers

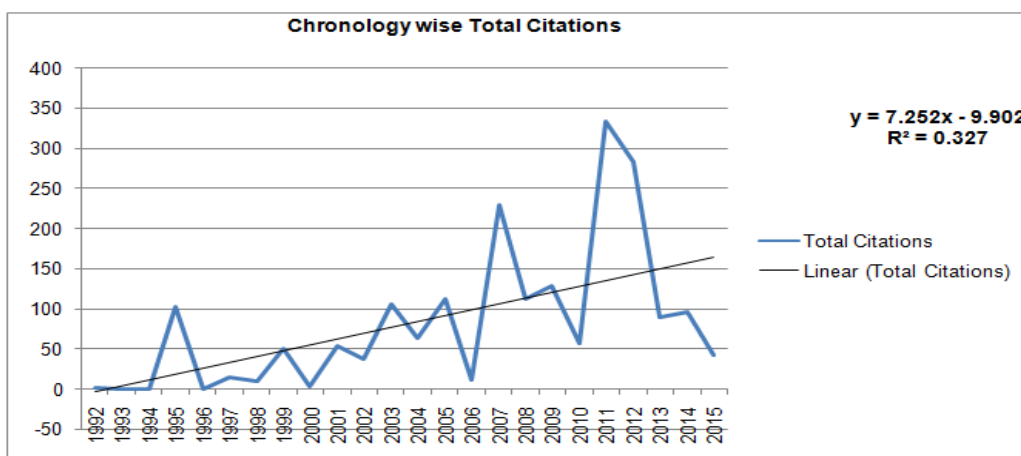


Figure 2. Chronology wise distribution of citations

### 3.1.2 Source based distribution

Table 2 presents different forms of periodical and non-periodical literature of Indian Scientists on social media research papers. It is clear from the analysis that the share of journal articles is the most predominant is bibliographic form of publication and it occupies 87.5 % (217) of total publications. The other ranked sources include Reviews 6.5% (16) contributions, Editorial materials and article related proceedings papers were observed 2.4% (6) and 2.0 % (5) contributions, and followed by remaining bibliographic forms such as book review, Letter, meeting abstract and Review based book chapter were scored very less number of outputs (below one percentage of output).

Table 2. Source based distribution

S. No	Document Type	Total Records	Total Percentage	Total Citations
1	Articles	217	87.5	1738
2	Reviews	16	6.5	136
3	Editorial Materials	6	2.4	36
4	Article; Proceedings Papers	5	2.0	21
5	Book Review	1	0.4	0
6	Letter	1	0.4	2
7	Meeting Abstract	1	0.4	0
8	Review; Book Chapter	1	0.4	5
<b>Total</b>		<b>248</b>	<b>100</b>	<b>1938</b>

### 3.1.3 Language-wise distribution of papers

Language wise distribution has been taken into consideration to evaluate during the period of study. Table4 shows the language wise published research papers on social media during the period. Based on the analysis, the research articles were written in only two languages. In which, the major proportion 99.6 percentage (247) of research publications were produced in English language and the remaining only one paper (0.4 %) was published in Spanish language.

**Table 3.** Language-wise distribution

S. No	Language	Total Records	Total Percent	Total Citations
1	English	247	99.6	1938
2	Spanish	1	0.4	0
<b>Total</b>		<b>248</b>	<b>100</b>	<b>1938</b>

### 3.1.4 Ranking of Institution-wise distribution of papers

Table 4 represents that the scholarly articles from Institutions and Universities on Social Media during 1992-2015. Out of 412 institutions, we have taken into account to analyze only top 10 most productive institutions and universities. Based on the analysis, the highest number of articles (9, 3.6%) with 39 global citations published by the ‘Jawaharlal Nehru University’ and ranked first. Indian Inst Management, Indian Inst Technology and University of Delhi were ranked second place publishing 8 records (3.2%) each with global citations 258, 21 and 26 respectively. Jamia Millia Islamia has got third rank with 6 articles (2.4%) and only 8 citations and the remaining institutions were ranked 4<sup>th</sup> position with below 6 records.

**Table 4.** Institution-wise distribution

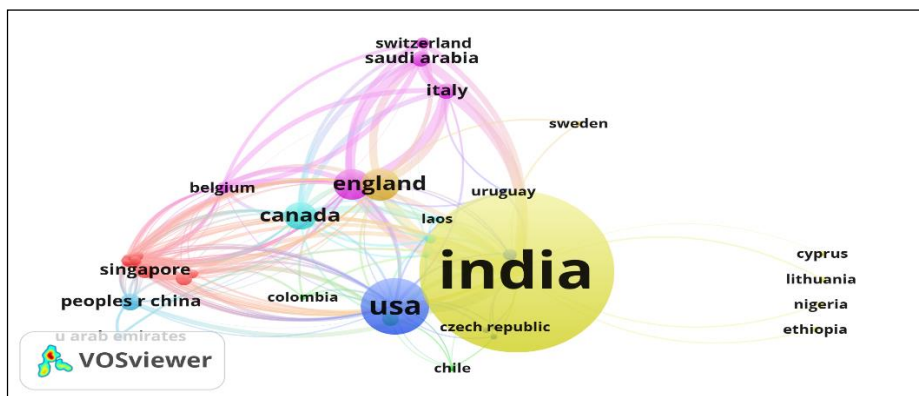
Rank	Institution	Total Records	Total Percent	Total Citations
1	Jawaharlal Nehru University	9	3.6	39
2	Indian Inst Management	8	3.2	258
2	Indian Inst Technology	8	3.2	21
2	University of Delhi	8	3.2	26
3	Jamia Millia Islamia	6	2.4	8
4	All India Inst Med Science	5	2.0	119
4	Int Inst Populat Science	5	2.0	22
4	Manipal University	5	2.0	55
4	Publ Hlth Fdn India	5	2.0	202
4	Tata Inst Social Science	5	2.0	9

### 3.1.5 International Collaboration

Table 5 depicts that the international collaborative research by Indian Scientists on Social Media. Out of 248 publications, the huge number of records (233, 94.0%) with 1781 global citations and the average citation per paper is 7.64. Out of 50 collaborative countries with India, it has been chosen only top 10 countries for the study. Among the top 10 countries, the most productive country was USA with 40 records (16.1%) and 812 citations and the average citation per paper was 20.3 and ranked first. The next product collaborative country was UK with 18 papers (7.3%) and its ACPP was 27.44. Australia has occupied third rank with 15 articles and its citations were 540. The least number of (only 4, 1.6%) collaborative country was Denmark with 284 citations and ranked 10<sup>th</sup> position.

**Table 5.** Country wise distribution

#	Country	Records	Percent	TGCS	ACPP
1	India	233	94.0	1781	7.64
2	USA	40	16.1	812	20.3
3	UK	18	7.3	494	27.44
4	Australia	15	6.0	540	36
5	Canada	13	5.2	492	37.85
6	Unknown	13	5.2	91	7
7	Peoples R China	6	2.4	252	42
8	Saudi Arabia	5	2.0	56	11.2
9	Singapore	5	2.0	237	47.4
10	Denmark	4	1.6	284	71



**Map 1.** Identification of collaborative countries

### 3.1.6 Degree of collaboration (DC)

The degree of collaboration (DC) is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period of time. This formula is suggested by Subramanyam (1983) is used and it is expressed as:

$$C = \frac{N_m}{N_m + N_s}$$

Where, C - denotes the degree of collaboration in a discipline; Nm- indicates the number of multi-authored research papers in the discipline published during a year; Ns- represents the number of single authored papers in the discipline published during the same year. Hence, it is observed and found based on the formula that the degree of collaboration on Social Media is 0.93.

**Table 6.** Degree of collaboration (DC)

Sl. no	Single Authors	Percentage	Multi-Authors	Percentage	Total-Authors	Total %	DC
1	58	6.69	808	93.31	866	100	0.93

Note: DC- Degree of Collaboration

The results reveal that the maximum number of publications was published multi-authored papers whereas the least number of papers was produced by solo authors.

### 3.2 Ranking of Core Journals on Social Media

Table 7 illustrates the rank-wise core Journals on Social Media. The most productive and top ranked journals are 'Contributions to Indian Sociology' and 'Indian Journal of Social Work' with 6 records (=2.4%) each and their total citations were 25 and 7 respectively. The 'Indian Journal of Animal Sciences' and 'Journal of Evolution of Medical and Dental Sciences-Jemds' were occupied second place with 5 articles (=2.0%) each. The remaining journals were ranked 3, 4, 5 and 6<sup>th</sup> place with below 2percentage among the core journals during the period of study.

**Table 7.** Ranking of core Journals on Social Media

Rank	Journal	Records	Percent	TGCS
1	Contributions to Indian Sociology	6	2.4	25
1	Indian Journal of Social Work	6	2.4	7
2	Indian Journal of Animal Sciences	5	2.0	6
2	Journal of Evolution of Medical and Dental Sciences-Jemds	5	2.0	0
3	Indian Journal of Agricultural Sciences	4	1.6	0
3	Indian Journal of Animal Research	4	1.6	0
3	Indian Pediatrics	4	1.6	72
4	Bmc Public Health	3	1.2	111
4	Cochrane Database of Systematic Reviews	3	1.2	54
4	Current Science	3	1.2	16
4	Indian journal of pediatrics	3	1.2	11
5	2 <sup>nd</sup> article *14	28	11.2	119
6	1 <sup>st</sup> article *174	174	70.4	1517
<b>Total</b>		248	100	1938

### 3.3 Ranking of Research Areas on Social Media

Table 8 indicates ranking of research areas on social media during the period of study. Based on the analysis, the huge number of 26 (7.365%) research papers were published in 'Business Economics' and ranked first. The next productive subject is 'Computer Science' with 23 papers (6.516%) and followed by 'Agriculture' has ranked third position with 20 records (5.666%). Among the top 10, the minimum number of 10 articles (2.833%) was published in the field of Psychology. It shows that the maximum number of researchers is interested to publish their research papers published on Business Economics.

**Table 8.** Research areas on social media

S. No	Research Areas	Records	% of 248
1	Business Economics	26	7.365
2	Computer Science	23	6.516
3	Agriculture	20	5.666
4	Public Environmental Occupational Health	18	5.099
5	Engineering	18	5.099
6	General Internal Medicine	15	4.249
7	Environmental Sciences Ecology	14	3.966
8	Science Technology Other Topics	13	3.683
9	Communication	12	3.399
10	Psychology	10	2.833

## FINDINGS AND CONCLUSION

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The scientometric analysis is one of the best ways to evaluate the scholarly publications in any discipline. Social Media is one of the upcoming and thrust areas in the digital society. The finding of the results shows that Jawaharlal Nehru University has published huge number of research papers and ranked first. Indian Inst Management, Indian Inst Technology and University of Delhi were ranked second. Among the top 10 countries, the most productive country was USA with 40 records (16.1%) and 812 citations and the average citation per paper was 20.3 and ranked first. The next product collaborative country was UK (7.3%) and its ACPP was 27.44. The journal articles are the most predominant in bibliographic form of publications and it occupies 87.5 % of total publications and ranked first. The maximum number of publications was published multi-authored papers whereas the least number of papers was produced by solo authors. The most productive and top ranked journals are 'Contributions to Indian Sociology' and 'Indian Journal of Social Work' with 6 records (=2.4%) each and their total citations were 25 and 7 respectively. The huge number of 7.365% research papers was published in 'Business Economics' and ranked first. As far as the research is concerned, this study has been identified that this is the first study which is done in the field of Social Media in terms of scholarly communications on India the period of 1989-2015. The same work has already done on Pharmacognosy (Velmurugan and Radhakrishnan, 2015).

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